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ABSTRACT

This booklet provides a guide for parents to help their children become successful in mathematics. The information contained is divided into four sections: (1) "Important Facts About Mathematics"; (2) "What To Expect in Your Child's Math Class"; (3) "Helping Your Child at Home"; and (4) "Planning for Your Child's Success in Mathematics." Sources of additional help and information are provided at the back of the booklet. (YP)

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The Changing Mathematics Curriculum

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A Booklet for Parents

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CALIFORNIA STATE DEPARTMENT OF EDUCATION
Sacramento, 1989

The Changing Mathematics Curriculum

A Booklet for Parents

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A Message to Parents from California's Superintendent of Public Instruction

Mathematics instruction in our schools is changing. Changes are taking place not only in *what* students learn but also in *how* they learn. As part of this new approach, educators and parents should work together to help students:

1. See the beauty and power of mathematics so that the students will want to learn more.
2. Use mathematics to make sense of the world. In this way students will better understand what is happening around them.
3. Solve problems by using the tools and processes of mathematics:
   a. Blocks, counting sticks, and beans
   b. Calculators and computers
   c. Paper and pencil
   d. Mental arithmetic and estimation
   e. Thinking skills
4. Clarify and communicate mathematical ideas by working with others and writing about mathematics.
5. Apply mathematics to real-life situations such as:
   a. Parking a car efficiently by using ideas learned in geometry
   b. Determining whether the change they received from a purchase is correct
   c. Understanding graphs in newspapers
   d. Questioning television advertisements

You are a vital part of your child's success, and this booklet has been designed to help you. The information contained in this booklet is divided into four sections:

1. Important Facts About Mathematics
2. What to Expect in Your Child's Mathematics Class
3. Helping Your Child at Home
4. Planning for Your Child's Success in Mathematics

Sources of additional help and information are included at the end of the booklet.

Important Facts About Mathematics

All students need to study mathematics.

Students must be prepared to make mathematically informed decisions about their jobs, their government, and their personal lives. Most jobs require knowledge of mathematics, and promotions are more likely for people who can think of many ways to solve a problem.

All students can succeed in mathematics.

When parents expect their children to do well, the children will generally succeed. Whether or not the parent is skilled in mathematics, the child can be helped through encouragement.

Understanding mathematics is more important than answering problems quickly.

The tools of mathematics, such as blocks, beans, diagrams, and calculators, help students to see how mathematics works and to develop their thinking skills.

Giving a quick answer to a problem in mathematics does not help students learn how to think.

There are many ways to arrive at an answer or solve a problem.

To solve a difficult problem, students may want to act out the problem with people, draw a picture, guess at an answer, or work backward.

When students need to multiply 25 times 14, some of them may find it easier to do the problem in their head rather than using paper and pencil. First, they multiply 25 times 10 to get 250; and then they add 25 times 4 or 100 to get the answer of 350.

See whether you can help your child find several ways to solve each problem.

Mathematics is more than arithmetic.

Just as important as arithmetic are geometry, measurement, probability and statistics, patterns and functions, logic, and algebra.

Learning how and when to use a calculator is important.

The use of a calculator can help your child develop mathematical ideas. Young children who explore with calculators learn how arithmetic works.

The basic facts of arithmetic as well as addition, subtraction, multiplication, division, and percents can be learned through the use of a calculator.

Working together can help students learn better.

Many scientists and mathematicians do their best thinking when sharing ideas with others. Your child will learn better if she or he talks with classmates, teachers, and you about homework problems as well as puzzles, games, and ideas.

Mathematics is powerful and beautiful, and studying mathematics can be enjoyable.

Students should be able to play with mathematical ideas, take chances, and try new things. The most important message for you and your child is to relax and, as much as possible, enjoy mathematics.

What to Expect in Your Child's Mathematics Class

Students should be:	*Because:*
Actively involved in exploring problems they care about	Using mathematics in a practical way requires more than arithmetic. Students make sense of mathematics when they solve interesting problems.
Working with real objects, not just paper and pencil	Using objects helps students make sense of abstract ideas. Students who memorize rules of arithmetic without understanding why and where they work often do not know how to use mathematics in real-life situations.
Using calculators	With calculators students can think more critically about difficult and interesting problems. Calculators do not replace thinking; instead, they require students to think about what makes sense in a particular situation. Business people, mathematicians, scientists, and many others use calculators in their work and at home.
Working in small groups and talking about their ideas and questions	When students solve problems together, they try to explain their thinking to others and to understand how others think. Being able to work well in a group is an important skill in business. In fact, more people are fired for not being able to work with others than for any other reason.

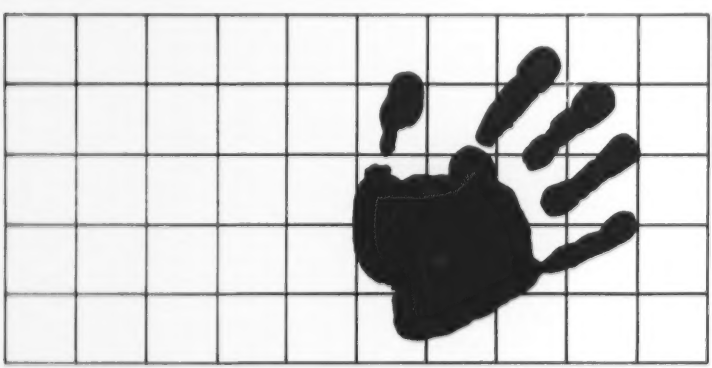
Writing about the mathematics problems

Writing also helps students learn. Writing helps students clarify their thinking and helps the teacher discover what the students understand.

As students proceed through the grades, their understanding of mathematical concepts is developed and elaborated, and they are able to apply mathematics sensibly and in more complex situations. Consequently, the specific activities you observe your child doing should be appropriate for his or her grade level. The following activities, arranged according to grade level, include those appropriate for students in kindergarten through grade twelve:

Kindergarten Through Grade Three

Most children come to school knowing how to count. But children need many real-life experiences with materials to develop a sense of numbers; that is, to learn what it means to add, subtract, multiply, and divide. To develop a sense of numbers, students may compare objects by shape, color, and size or survey their interests and, with their classmates, make graphs about them.



Grades Three Through Six

Students should be learning paper-and-pencil methods only after they have a good sense of mathematical processes. They should continue to calculate mentally or use a calculator. In addition, students in grades three through six solve problems that involve measurement, geometry, and statistics. For example, they may make a scale drawing of their classroom and indicate other furniture arrangements preferred by their classmates.

Grades Six Through Eight

Students should use exponents, fractions, and decimals to solve problems that involve large and small numbers. The problems solved by students in grades six through eight are more complex than those solved by students in earlier grades. However, students still use a variety of methods and materials to solve them.

Grades Eight Through Twelve

A few students prepare for college by taking Algebra 1 in grade eight. Other students will wait until grade nine.

Ninth-grade students not ready for Algebra 1 take a new course called Math A. This course is designed to help students gain confidence in solving problems and using mathematics. In Math A, students investigate important mathematical ideas by solving interesting and challenging problems. Students use materials and talk and write about what they do to make mathematics relevant to their lives.

Helping Your Child at Home

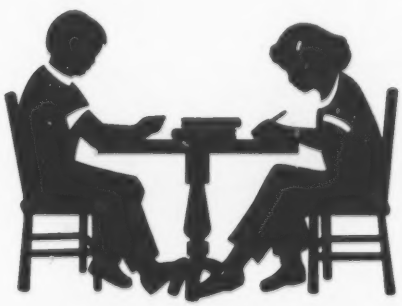
Help your child with homework.

Most students are assigned homework daily or several times a week in their mathematics classes. Children who regularly do homework are more successful in mathematics than children who do not do homework. Homework should not, however, be seen or used as punishment. The best mathematics homework is interesting and challenging to students. It is work that they understand.

Often, it is helpful for children to do their homework together. The conversations they have will help them clarify ideas, clear up misunderstandings, and increase their ability to communicate.

You should provide a quiet place for your child to do homework. Set aside a special time and communicate your desire and willingness to help. Expect that the homework will be done.

Do not tell your child how to do the homework. Listening may help more than



talking. Ask your child to explain to you what he or she is doing. Doing so may often be enough to get your child started.

When your child gets stuck on a problem, offer suggestions for resolving it: "Why don't you guess what the answer might be and then see how close your guess is?" "Could you do the problem with easier numbers?" "Would it help to draw a picture, act the problem out, or use objects?"

When your child is finished, check to see what he or she has done and make a positive comment.

Encourage a child who is having serious difficulties with mathematics.

Talk to the teacher and find out what he or she thinks would help. Share with the teacher what you have observed about your child.

Your belief that your child can succeed and your support can help your child to feel good about himself or herself. Saying "That problem is easy; let me show you" communicates to your child that you do not believe he or she is intelligent. Instead, help your child to understand the problem and say, "Now, is that still hard?"

Show your child how you use mathematics daily.

Solve problems out loud and ask questions as you and your child watch television or play games together: "How do we decide when to put the turkey in the oven on Thanksgiving?" "How much does it cost to take care of the family dog for one year?" "What's the best way to get to the grocery store?" "How much time should we allow to get there, shop, get home, and prepare dinner?"

Planning for Your Child's Success in Mathematics

Visit your child's classroom and participate in school events.

A visit to your child's classroom will let you see how your child is learning mathematics. In addition, many teachers welcome parents as volunteers on a regular basis or with special projects.

Many schools have special events related to mathematics. Family math classes for parents and children are fun and provide many activities and games to do at home. Parents are often invited to participate in committees that plan or monitor a school's instructional program. A PTA group may hold a fund-raising event to purchase mathematics materials for classrooms.

Ask for and attend parent conferences.

Parent-teacher conferences provide an opportunity to plan what is best for your child. (Sometimes it is beneficial for your child to be part of the conference.) Share information with the teacher about your child's understanding and special interests. Listen and discuss suggestions the teacher makes. Make plans as to what each of you will do to help your child succeed in mathematics.

Encourage your child to take courses in mathematics.

More than 75 percent of all jobs require proficiency in simple algebra and geometry.

A person's earning power tends to increase in proportion to one's knowledge of mathematics.

To enter the California State University system, students must complete two years of college preparatory mathematics. Some colleges and universities require for admission a minimum of three years of college preparatory mathematics courses. And the University of California system usually requires students to complete four years of college preparatory mathematics.

Additional Sources of Help and Information

Often, your child's teacher is the first source of help and information. The local library, the public libraries, bookstores, science centers, and museums are other sources. Books and pamphlets that may be helpful include the following:

Burns, Marilyn. *Math for Smarty Pants: Or Who Says Mathematicians Have Little Pig Eyes*. Boston: Little, Brown & Co., 1982.

Burns, Marilyn. *The I Hate Mathematics Book*. Boston: Little, Brown & Co., 1975.

Everybody Counts: A Report to the Nation on the Future of Mathematics Education. Washington, D.C.: National Academy Press, 1989.

Help Your Child Get the Most Out of Homework. Chicago: National PTA, 1988.

Skolnick, Joan, and others. *How to Encourage Girls in Math and Science: Strategies for Parents and Educators*. Englewood Cliffs, N.J.: Prentice Hall, 1982.

Stenmark, Jean, and others. *Family Math*. Berkeley: University of California, Lawrence Hall of Science, 1986.

The following publications are available from the California State Department of Education, Bureau of Publications, Sales Unit, P.O. Box 271, Sacramento, CA 95802-0271. California residents should add the appropriate sales tax for each publication.

Enrichment Opportunities Guide: A Resource for Teachers and Students in Math and Science (without binder) (1988; $5.75)

Mathematics Framework for California Public Schools (1985; $3)

Mathematics Model Curriculum Guide: Kindergarten Through Grade Eight (1987; $2.75)

Model Curriculum Standards: Grades Nine Through Twelve (1985; $5.50)

For additional information contact the Mathematics and Science Education Unit, California State Department of Education, P.O. Box 944272, Sacramento, CA 94244-2720; telephone (916) 324-7190.

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o-8011-0664-8	Mathematics Model Curriculum Guide, K—8 (1987)	2.75
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